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THESIS

THE COMPREHENSIVE TEST BAN TREATY AND ITS SECURITY IMPLICATIONS FOR THE UNITED KINGDOM AND THE UNITED STATES

by

Luke Sironi

December 1998

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THE COMPREHENSIVE TEST BAN TREATY AND ITS SECURITY IMPLICATIONS FOR THE UNITED KINGDOM AND THE UNITED STATES

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Lieutenant, United States Navy
B.S., Carnegie Mellon University, 1992

Submitted in partial fulfillment of the
requirements for the degree of

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ABSTRACT

The United Kingdom has signed and ratified the Comprehensive Test Ban Treaty. The United States signed the treaty in September 1996, and currently the decision on whether to ratify it is pending in the Senate. Key differences reside in the political and objective strategic situations of the United States and the United Kingdom. In the United Kingdom's parliamentary system a single party (or a coalition) makes decisions. The United States, however, was designed to have a separation of powers, and this insures that the legislative and executive branches have opportunities for discord as well as cooperation. Currently the United Kingdom has operational weapons production facilities, whereas the United States does not. The United Kingdom has only one nuclear weapons program (the Trident missile) to maintain, whereas the United States has multiple delivery systems and warhead types to maintain. The United Kingdom's nuclear deterrent provides for the country's security needs, yet the United Kingdom is also covered by U.S. nuclear commitments. Indeed, the United States provides extended deterrence protection for allies and security partners around the world. These responsibilities imply that the implications of the CTBT could be more momentous for the United States than for the United Kingdom.

TABLE OF CONTENTS

I. INTRODUCTION **1**
  A. METHODOLOGY 1
  B. WHY THE CTBT IS IMPORTANT TODAY 1
  C. THESIS OUTLINE 4
II. THE COMPREHENSIVE TEST BAN TREATY - BACKGROUND **7**
  A. ORIGINS OF THE CTBT 7
    1. The First Three Party Agreement 7
    2. The Partial Test Ban Treaty 8
    3. The Non-Proliferation Treaty 9
    4. The Second Three-Party Negotiations, 1977-1980 10
    5. Further Steps Towards a CTBT, 1981-1993 11
  B. REQUIREMENTS OF THE CTBT 14
  C. CURRENT GOALS OF THE CTBT 15
  D. ENTRY INTO FORCE PROVISIONS 16
III. UNITED KINGDOM **19**
  A. SUPPORTERS OF THE CTBT 25
  B. OPPONENTS OF THE CTBT 26
  C. THE SITUATION SINCE THE APRIL 1998 RATIFICATION OF THE CTBT 28
IV. UNITED STATES **33**
  A. PROPONENTS OF CTBT RATIFICATION 33
  B. OPPONENTS OF CTBT RATIFICATION 40
    1. Risks of the Stockpile Stewardship Maintenance Program 40
    2. Nuclear Production/Manufacturing Issues 43
    3. No Bar to Proliferation--Can't be Effectively Verified 44
  C. CURRENT PROSPECTS FOR CTBT RATIFICATION 46
V. ANALYSIS AND CONCLUSION **51**
  A. COMPARISON OF THE UNITED KINGDOM AND THE UNITED STATES POLICIES 51
  B. IMPLICATIONS FOR THE FUTURE OF THE UNITED KINGDOM AND THE UNITED STATES NUCLEAR POSTURES 55
  C. UNITED STATES RESPONSIBILITIES 59
    1. Recommendations for the future of the nuclear stockpile 59
    2. Recommendations for DOD 60
BIBLIOGRAPHY **63**
INITIAL DISTRIBUTION LIST **69**

EXECUTIVE SUMMARY

On 24 September 1996 President Clinton became the first national leader to sign the Comprehensive Test Ban Treaty (CTBT). Since then 149 states have signed the CTBT, including all five of the nuclear weapon states recognized by the Non-Proliferation Treaty (NPT). Of these 149 states, 13 have ratified the treaty. Only six of the 44 countries necessary for the CTBT to enter into force have ratified the treaty. On 6 April 1998 the United Kingdom ratified the CTBT. The United Kingdom is one of the forty-four countries whose ratification is necessary for the CTBT to enter into force, as is the United States. The Clinton Administration supports United States ratification of the CTBT, but the United States Senate has yet to take action, owing in part to concerns about its implications for the United States nuclear posture. To guarantee that the United States nuclear stockpile remains safe and reliable, the Clinton administration has started the Stockpile Stewardship and Management Program (SSMP).

The importance of the CTBT is illustrated by the arguments of its detractors. In their view, prolonged compliance with a no-test regime could hurt the credibility of the United States nuclear arsenal, because the reliability of the nuclear weapons might be in question. Members of Congress, leading scientists, retired military leaders, and even experts at the nuclear laboratories have raised questions about the cogency of the official arguments for the CTBT and the SSMP. They contend that the CTBT will only reduce confidence in an already aging nuclear stockpile.

In the summer of 1999, if the CTBT has not entered into force, the Secretary-General of the United Nations will convene a Conference of the States that have already deposited their instruments of ratification on the request of a majority of these states. The Conference will decide if the CTBT can enter into force without all 44 of the required nations ratifying the treaty. Only those States that have ratified the treaty will be invited to the Conference. However, all states that have signed the CTBT will be invited to attend as observers. Prior to the Conference there will be strong pressure on the United

States Senate to ratify the CTBT so that the United States will have a vote in the treaty negotiations.

There are major differences in the circumstances leading up to the ratification of the CTBT by the United Kingdom and the current situation in the United States. The first difference is that the United Kingdom has a functioning nuclear warhead production complex. In the United States, however, no production lines for the plutonium "pits" for nuclear weapons have been in operation since the 1989 shutdown of the Rock Flats facility. The United States will also have no dedicated means of producing tritium until at least 2005.

Britain's nuclear weapons program relies on a single and relatively new delivery system, the Trident missile. The United States has committed itself to maintaining numerous delivery systems and warhead types in operation. Many of these systems are as old as twenty years. The United Kingdom can continue the production of the Trident warhead in the foreseeable future and successfully insure that it has a valid weapons program. However, since the United States does not currently have a production capability, it would have to develop one to meet this challenge in the same way.

Political differences are also relevant in the comparison of the United Kingdom and the United States. In the United States, the two party system and the constitutional separation of powers frequently result in a situation in which the President, the chief of the executive branch of the government, is not a member of the same party as the majority in the legislative branch. In the United Kingdom, the parliamentary system is set up so that there is only one party (or, on some occasions, a coalition of like-minded parties) in charge of the legislative and executive actions of the government. That party or governing coalition can usually act with much greater latitude and dispatch than the United States government, owing to the latter's recurrent legislative-executive disagreements. Another key difference between the United Kingdom's ratification process and that in the United States resides in the role of non-governmental organizations (NGOs). In the United Kingdom the historical pattern has been for a small and select group of individuals within a party or coalition of parties holding a majority in the House of Commons to make all the key decisions. In the United States, however, the role of NGOs is more important because they can influence legislators and their staffs, as well as voters and the general climate of opinion. These political dynamics have made for a roller coaster ride for the CTBT in the United States, and the end of the ride (ratification or non-ratification) is not yet clear.

There are no foreseeable problems in the British nuclear posture unless the Trident missile system develops a fatal flaw. Ratifying the CTBT has perhaps increased the diplomatic power of the United Kingdom and allowed it to have more say in world politics, at least with regard to CTBT-associated questions. The United Kingdom has not harmed its national security in any way by ratifying the CTBT, at least in the foreseeable future. This judgement assumes that no stockpile safety or reliability questions will arise that could only be resolved through explosive testing.

The security interests of the United States, on the other hand, could possibly be harmed by the CTBT. If the credibility of the nuclear arsenal was called into question, the United States would no longer have an effective nuclear deterrent. If a rogue state believed that the United States no longer had the capability to respond to an act of aggression with a reliable nuclear weapon, the value of the rogue state's weapons of mass destruction (nuclear, chemical, and biological) would increase and the probability of the threat of use against the United States (or United States forces or interests) could also increase. Every day that the testing moratorium is continued in the United States may be one day closer to a possible failure of a warhead, given the risk of increasing uncertainties about weapons reliability. Personnel issues could also raise problems in the United States. Soon there will be no one working for the weapons laboratories who has ever had one of his or her warhead designs actually tested. Finally, the CTBT might cause proliferation. Nuclear testing has demonstrated to United States allies, as well as to potential adversaries, that the United States has a strong commitment to its allies and security partners and that the United States nuclear deterrent is strong. Any decline in the confidence that the United States has in its nuclear arsenal or that others have in the

United States commitment to nuclear deterrence could signal to other nations that are now under America's nuclear umbrella that the United States is no longer serious about upholding its nuclear responsibilities.

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I. INTRODUCTION

> Without nuclear testing, new, safe, secure, reliable, and less complex nuclear weapons cannot be developed and produced. Without nuclear testing, whether or not the U.S. can maintain existing nuclear weapons with a high degree of confidence in the future has become a dangerous open question for the first time in fifty years.[1]

A. METHODOLOGY

The purpose of this thesis is to examine policy making by comparing two case studies. The first case study concerns the United Kingdom's decision to ratify the CTBT. The second case study is devoted to the current United States debate on whether to follow suit and ratify the CTBT. The analysis is based on open sources including newspapers, Congressional committee point papers, advocacy group studies, and works of scholarship. Background interviews were conducted with experts at the Lawrence Livermore National Laboratory, the Strategic Command at Offutt Air Force Base, the Office of the Secretary of Defense and the Joint Staff in the Pentagon, and with senior staffers on the Joint House and Senate Special Committee on National Security.

B. WHY THE CTBT IS IMPORTANT TODAY

On 24 September 1996 President Clinton became the first national leader to sign the Comprehensive Test Ban Treaty (CTBT). Since then 149 states have signed the CTBT, including all five of the Non-Proliferation Treaty (NPT)-recognized nuclear weapon states. Of these 149 states, 13 have ratified the treaty. Only six of the 44 countries necessary for the CTBT to enter into force have ratified treaty. Since the May 1998 nuclear tests in India and Pakistan. there has been an increasing interest in debating the value of the CTBT within the United States.

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[1] House Committee on National Security, *The Clinton Administration and Nuclear Stockpile Stewardship: Erosion by Design*, report prepared by Floyd D. Spence, Chairman House National Security Committee, 30 October 1998, p. 15.

On 6 April 1998 the United Kingdom ratified the CTBT. The United Kingdom is one of the forty-four countries whose ratification is necessary for the CTBT to enter into force, as is the United States. Nuclear weapons are a cornerstone of the United Kingdom's national security posture. By ratifying the CTBT, the United Kingdom has agreed not to conduct any further explosive tests of nuclear devices. From this, one can conclude that the United Kingdom has complete confidence in its ability to maintain indefinitely its nuclear warheads. Otherwise, there would be no reason for the United Kingdom to make such a bold statement before other countries had done so. What is the future of the United Kingdom's nuclear arsenal? How long will the United Kingdom be able to maintain a credible nuclear deterrent without testing?

In the United States, the Clinton administration feels very strongly that the CTBT should be ratified by the United States Senate, and has made it a top priority of the White House. President Clinton has stated that ratifying the CTBT will not hinder America from maintaining a safe and reliable nuclear deterrent in the future, that it will constrain the development of more advanced nuclear weapons by the declared nuclear powers, and that it will hinder the development of new nuclear weapons by "rogue" states. To guarantee that the nuclear stockpile in the United States remains reliable, the Clinton administration has started the Stockpile Stewardship and Management Program (SSMP).

This program is intended to provide for the safety and reliability of the nuclear stockpile. The SSMP includes efforts to foster further research on nuclear-related issues to encourage ongoing interest in these issues in the academic world. According to President Clinton, the CTBT will improve America's ability to detect and deter nuclear explosive testing and will strengthen the NPT regime and the US ability to lead the global nonproliferation effort.[2] The United States is currently upholding a no-test moratorium while a ratification debate is ongoing in Congress.

The importance of the CTBT is illustrated by the arguments of its detractors. In their view, prolonged compliance with a no-test regime could hurt the credibility of the United States nuclear arsenal, because the reliability of the nuclear weapons might be in question. Members of Congress, leading scientists, retired military leaders, and even experts at the nuclear laboratories have come out on record against the Clinton administration. They contend that the CTBT will only reduce confidence in an already aging nuclear stockpile. They judge that the goals of the President's SSMP will not be achievable without additional data, and that this data can only be obtained through further nuclear explosive testing. These observers state that the CTBT will not increase the United States ability to monitor seismic activity, nor is the CTBT enforceable. In their view, the CTBT will not decrease nuclear proliferation, nor will it prevent countries from building first generation nuclear devices. Critics of the CTBT contend that the CTBT will only serve the United States in developing more modern weapons, improving safety measures, and insuring the reliability of the current stockpile.

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[2] The White House, *Comprehensive Test Ban Treaty: Test Ban News,* 13 March 1998, available on-line at http://www.acda.gov/ctbtpage/tbn10.htm

In the summer of 1999, if the CTBT has not entered into force, the Secretary-General of the United Nations will convene a Conference of the States that have already deposited their instruments of ratification, on the request of a majority of these states. The Conference will decide if the CTBT can enter into force without all 44 of the required nations ratifying the treaty. Only those States that have ratified the treaty will be invited to the Conference. However, all states that have signed the CTBT will be invited to attend as observers. Prior to the Conference there will be strong pressure on the Congress to ratify the CTBT so that the United States will have a seat at the treaty negotiations. It is probable that no decision to act on the CTBT will be made by the House National Security Committee and Senate Foreign Relations Committee, where the CTBT is currently awaiting a decision, until the late spring of 1999. Without a positive decision by the Senate Foreign Relations Committee, the Treaty will never get to the Senate.

C. THESIS OUTLINE

Chapter two of the thesis provides background on the CTBT and the current debate. The requirements for the treaty to enter into force are discussed, as well as the prospects for these requirements being met in the foreseeable future.

Chapter three discusses the arguments advanced by the supporters and opponents of the CTBT in the United Kingdom. It also examines how the treaty has affected the

United Kingdom's nuclear posture since its ratification by Parliament on 6 April 1998. Possible future effects on the United Kingdom's national security are also discussed, as well as explanations for the United Kingdom's decision to ratify the CTBT.

Chapter four reviews the arguments for and against the United States ratifying the CTBT, as well as the basic implications of each position. The proponents and opponents of the CTBT have a variety of agendas. Many proponents of the CTBT do not hold the goal of a long-term commitment to maintaining a credible nuclear arsenal. Non-governmental organizations devoted to nonproliferation, arms control, and the abolition of nuclear weapons all back the current administration, however, in pushing for the ratification of the CTBT. This chapter includes an assessment of the current prospects for United States ratification.

Chapter five analyzes and compares the United Kingdom's decision to ratify the treaty with the United States prospects for ratification. Was the decision by the United Kingdom to ratify the CTBT based on circumstances prevailing in that country but not in the United States? Do these differences preclude the United States from following the example of the United Kingdom, or do the decisions of the United Kingdom support the ratification of the CTBT by the United States? Are the differences in the political systems of the United Kingdom and the United States reason enough to conclude that there may be different outcomes regarding the ratification of the CTBT? What political goals does ratifying the CTBT fulfill in the United Kingdom? Are these goals equally important and valid for the United States? Implications for the future of the United

Kingdom and the United States nuclear arsenals are also discussed, including recommendations to secure the future of the United States nuclear stockpile.

II. THE COMPREHENSIVE TEST BAN TREATY - BACKGROUND

A. ORIGINS OF THE CTBT

1. The First Three Party Agreement

The CTBT has a long history. Practically since the day the first nuclear bomb was dropped, some people have advocated an end to all nuclear testing. In 1957 United States President Dwight Eisenhower announced that he favored a test ban. This announcement was made for at least three reasons – an interest in stopping the pollution caused by radioactive fallout, a desire to respond to public anxieties in the United States and abroad, and a belief that ending tests would curb the nuclear arms race.[3] In 1958, at the Conference on the Discontinuance of Nuclear Weapon Tests in Geneva, the United States, the USSR, and the United Kingdom agreed to a three year moratorium on testing. This ended in 1960 when France (which was not a party to the agreement) started nuclear testing. The USSR and the United States resumed testing in 1961. Eisenhower called the failure to achieve a ban on nuclear testing "the greatest disappointment of any administration – of any decade – of any time and of any party."[4]

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[3] John Edmonds, *A Complete Nuclear Test Ban – Why Has it Taken so Long*? Council for Arms Control, London, U.K., 1994, p. 376.

[4] The White House, *Efforts to Ratify Historic Treaty Begin*, The White House Working Group on the Comprehensive Test Ban Treaty, 28 October 1997.

2. The Partial Test Ban Treaty

The next landmark in the quest for a nuclear test-free world was the Partial Test Ban Treaty concluded during the Kennedy administration. In calling for a test ban, President Kennedy said, "every man, woman and child lives under a nuclear sword of Damocles, hanging by the slenderest of threads, capable of being cut at any moment by accident or miscalculation or by madness. The weapons of war must be abolished before they abolish us.... The logical place to begin is a treaty assuring the end of nuclear tests of all kinds...."[5] The United Kingdom, the USSR, and the United States continued with their negotiations to stop nuclear testing. The Partial Test Ban Treaty (PTBT) of 1963 was the first important step in nuclear arms control. The United Kingdom had ceased atmospheric testing in 1958 and the United States and the USSR had ceased atmospheric testing in 1962. France and China, the two nuclear-weapon states (NWS) who remained outside the treaty, eventually chose to abide by its provisions. France stopped atmospheric tests in 1974 and China did so in 1980. Since 1980, all nuclear tests have been conducted underground.[6] Even the May 1998 tests by India and Pakistan were in keeping with the spirit of this global norm and were conducted underground. The preamble of the PTBT declares that the NWS were "seeking to achieve the discontinuance of all test explosions of nuclear weapons for all time, [and were] determined to continue negotiations to this end."[7] This point is emphasized in the operative part of the treaty. Article I includes a provision that the PTBT was concluded "without prejudice to the conclusion of a treaty resulting in the permanent banning of all nuclear test explosions, including all such explosions underground, the conclusion of which, as the Parties have stated in the Preamble to this Treaty, they seek to achieve".[8] This goal of the PTBT has not yet been achieved. However, other steps in the general direction of non-proliferation have been achieved in the meantime—for instance, the Nonproliferation Treaty.

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[5] Ibid., p. 2.

[6] Edmonds, *A Complete Nuclear Test Ban*, p. 377.

3. The Non-Proliferation Treaty

The Non-Proliferation Treaty (NPT) of 1968 forwarded the cause of a no-test world. The NPT's preamble repeated the commitment to "the discontinuance of all test explosions of nuclear weapons for all time."[9] From 1968 to 1992 there were few accomplishments towards the goal of a no-test world. The two testing-related treaties that followed the NPT, the Threshold Test Ban Treaty (TTBT) in 1974 and the Peaceful Nuclear Explosions Treaty (PNET) in 1976, imposed no further comprehensive limitation on nuclear weapons testing. At the conferences to review the NPT every five years the most contentious issue was always the CTBT. During the same period the United Nations (UN) General Assembly passed many resolutions by massive majorities urging the "early discontinuance of all nuclear test explosions for all time". In December 1992, in the final weeks of the Bush Administration, the UN General Assembly vote was 159 in favor and 1 against (the United States), with 4 abstentions (China, France, Israel, and the United Kingdom).[10] In 1993, however, the resolution was adopted by consensus.

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[7] Ibid., p. 377.

[8] Ibid., p. 377.

[9] Ibid., p. 377.

4. The Second Three-Party Negotiations, 1977-1980

During President Carter's term in office (1977-1981) three main issues hampered the signing of a Comprehensive Test Ban Treaty (CTBT). The differences of principle on these issues were between Moscow on one hand and Washington and London on the other. The first issue was the usual Soviet claim that the West's verification system was much too intrusive. The second issue concerned the proposal by the United Kingdom and the United States that peaceful nuclear explosions be banned in the same treaty that would ban weapons testing. A ban on peaceful nuclear explosions was unacceptable to the Soviets since they had the only peaceful nuclear explosions program in the world at that time and wished to continue it. The third item of contention was the Soviet position that a comprehensive test ban should not come into force until France and China had joined it.[11] The Soviets argued that a prohibition on testing would be strategically unwise if the ban did not apply to all countries equally. Inconclusive debates continued until the election of Margaret Thatcher's Conservative government in Britain in 1979, an event followed the next year by Ronald Reagan's victory in the United States presidential elections.

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[10] Ibid., p. 378.

[11] Ibid., pp. 376-80.

5. Further Steps Towards a CTBT, 1981-1993

The Reagan administration wanted to renegotiate the TTBT and PNET treaties with the USSR. The Reagan administration was against signing a CTBT, for it judged that it was not in the interests of the United States to stop testing. Testing was seen as a way to protect the safety and reliability of the nuclear stockpile. The Soviets countered with the argument that renegotiating the TTBT and the PNET was just a way for the United States to stalemate further talks on a CTBT. During these years the five nuclear powers continued to test nuclear weapons, totaling more than 50 per year.[12]

In 1985, when Mikhail Gorbachev came to power, he announced that the USSR was ready to resume negotiations on the CTBT. British attitudes had also begun to change. It had become more evident to the British that, through atmosphere monitoring and seismic measuring, one could be more assured of reliable verification means for the CTBT.

In 1992 President Boris Yeltsin announced that Russia would maintain Gorbachev's moratorium on testing, and Yeltsin called for the other NWS to follow suit. France in April 1992 for the first time announced a testing moratorium. At approximately the same time, France and China announced that they were ready to join the NPT. The United States Congress mounted strong pressure in favor of a test ban. Congress passed an Act, which was reluctantly signed by President Bush on 2 October 1992, that had the effect of insuring that the issue would not come up in the 1992 elections.[13] This act provided for a moratorium on United States testing until at least July 1993.[14] In July 1993, President Clinton stated that his plan was to extend the moratorium and to pursue CTBT negotiations.[15] These and subsequent events were summed up as follows by the Congressional Budget Office:

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[12] Ibid., p. 380.

> In 1992, the Congress added the Hatfield Amendment to the Energy and Water Appropriations Act for Fiscal Year 1993, which halted all U.S. underground tests after September 1996. The amendment allowed DOE to conduct up to 18 more tests during the intervening four years. But the Bush Administration opted not to conduct any, and President Clinton has extended that moratorium several times. As a result, the United States has not conducted an underground test since 1992.[16]

During this period the United Kingdom was urging the United States to abandon the moratorium on testing, because the United States test facility in Nevada was the United Kingdom's only test site. However, shortly after President Clinton's official announcement in July 1993 on the extension of the moratorium, the United Kingdom expressed its readiness to take part in the CTBT negotiations.

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[13] Congress, House, Making appropriations for energy and water development for the fiscal year ending September 30, 1993, and for other purposes., 102nd Cong., 2nd sess., H.R. 5373.

[14] Ibid., p. 381.

[15] The White House, *Comprehensive Test Ban Treaty Chronology During Clinton Administration*, Fact Sheet, Office of the Press Secretary, 22 September 1997.

[16] Congressional Budget Office, *Preserving the Nuclear Weapons Stockpile Under a Comprehensive Test Ban*, CBO Papers, May 1997, p. 6.

During the period from 1993 to the present, China, France, India, Pakistan, and possibly Russia[17] have all tested nuclear weapons. With the exception of Russia, all have stated that their testing was done to enable them to join the CTBT. On 22 August 1996, Australia requested the Secretary General of the United Nations to reconvene the fiftieth United Nations General Assembly (UNGA) for the purpose of receiving and acting upon the CTBT text. On 10 September 1996, the UNGA adopted the CTBT by a vote of 158 to 3, with 5 abstentions.[18] Since President Clinton signed the CTBT in 1996, 149 nations have signed, including all five of the NPT-designated nuclear-weapon states. Twenty-one countries have ratified the treaty, including France, Germany, and the United Kingdom.[19] However, there is still much to be done before the CTBT can enter into force. In accordance with the treaty's entry into force provisions, forty-four specific countries—including all the NPT-designated nuclear-weapons states and all the "threshold" states—must sign and ratify the CTBT before it can enter into force, and some observers speculate that this may not happen.[20]

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[17] In articles reported by the Washington Times and CNN, US intelligence agencies "strongly suspect" that Russia exploded a small nuclear device underground early in 1996. The articles cited are: the Washington Times, *US Officials Suspect Russia Staged Nuclear Test This Year; Blast Would Violate Moratorium Imposed in '92*, 7 March 1996; CNN World News, *US Suspects Russia Conduced Nuclear Test,* web posting on 7 March 1996; and the Washington Times, *Perry Cites Evidence of Russian Nuke Test: Suspicions unconfirmed, He Tells Panel*, 8 March 1996.

[18] The White House, *Comprehensive Nuclear Test Ban Treaty Signatories/Ratifiers.*

[19] Updated statistics on the status of the CTBT can be found on-line at http://www.acda.gov/factshee/wmd/nuclear/ctbt/ctbtsigs.htm

[20] To enter into force the CTBT must be ratified by forty-four specific countries, including India, Pakistan, and North Korea as well as Russia, China, and the United States. To date the governments of India and Pakistan have stated that they are not willing to join the CTBT. This was confirmed by the tests that were

B. REQUIREMENTS OF THE CTBT

The basic obligation of the CTBT is that no party to the treaty will conduct any further explosive nuclear test. This includes all explosive tests, no matter how small the yield. The obligations, as written in Article one of the CTBT, are as follows:

> Each State Party undertakes not to carry out any nuclear weapon test explosion or any other nuclear explosion, and to prohibit and prevent any such nuclear explosion at any place under its jurisdiction or control.
>
> Each State Party undertakes, furthermore, to refrain from causing, encouraging, or in any other way participating in the carrying out of any nuclear weapon test explosion or any other nuclear explosion.[21]

The second paragraph is included to insure that nations such as the United Kingdom could not ask other nations, such as the United States, to conduct tests for them and still be parties to the treaty. The United Kingdom in the past used test facilities in the United States to conduct its nuclear tests. The treaty would outlaw such arrangements. The treaty includes a ban on allowing another nation to test on one's territory, even if one is not actually involved in the test. In Article III, the CTBT makes each State responsible for all persons on its territory or in any place under its jurisdiction. Each State Party shall "prohibit natural and legal persons anywhere on its territory or in any other place under its jurisdiction as recognized by international law from undertaking any activity prohibited to a State Party under this Treaty."[22] This would each party responsible for all tests on its

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conducted by India and Pakistan in May 1998. India has also stated that it would join the CTBT after being admitted to the NPT as a nuclear-weapon state. This is widely agreed to be politically impossible.

[21] United Nations, *Comprehensive Test Ban Treaty*, Article I, Basic Obligations.

[22] Ibid., Article III, National Implementation Measures.

territory no matter who was doing the testing. As it is written, the CTBT is a treaty to ban all forms of nuclear explosive testing. This, however, has not always been the stated object of the treaty.

C. CURRENT GOALS OF THE CTBT

Questions still remain as to the goals of the CTBT. Originally it was thought that the CTBT was intended to stop all future nuclear explosive testing. This was for both environmental and political reasons. The preamble to the treaty includes a statement that the treaty will "contribute to the protection of the environment."[23]

Currently, however, the CTBT is being presented as a non-proliferation and disarmament treaty. The treaty's preamble states that the reason for a CTBT is to "reduce nuclear weapons globally, with the ultimate goal of eliminating those weapons and of general and complete disarmament under strict and effective international control."[24] Nowhere in the treaty, however, does it state that new weapons can not be built. The obligations defined in the treaty only ban nuclear explosive tests. With the knowledge that is held in the NWS, the production of weapons of tested designs can continue, as well as future improvements of weapons and, hypothetically at least, the development of new weapons. The United States has not had a requirement for a new nuclear weapon or delivery system since 1991, and has found existing weapons designs sufficient to date.[25]

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[23] Ibid., Preamble, para. 10.

[24] Ibid., Preamble, para. 5.

For this reason, among others, there is debate in the United States Congress as to the purposes and implications of the CTBT. If it is found that building new nuclear weapons or maintaining the reliability of current weapons is not in keeping with the spirit of the CTBT, then the Stockpile Stewardship Program would also not be in keeping with the spirit of the CTBT. This might be enough for Congress not to ratify the CTBT. Currently the United States Congress is debating what are the real goals and implications of the CTBT, while it decides whether to ratify it.

D. ENTRY INTO FORCE PROVISIONS

One of the reasons that many countries have not ratified the CTBT is that the CTBT will not enter into force until numerous requirements have been met. The first is that the treaty will enter into force no sooner than 180 days after all countries listed in Annex 2 to the CTBT have signed and ratified the treaty .[26] However, the CTBT will not enter into force until at least two years after September 1996, when the treaty first was opened for signature. Some of the countries that have been listed in Annex 2 to the

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[25] The B-61/11 does not involve any modification to the nuclear "physics package," but external modifications to the bomb case to change the mission of the weapon—that is, to enable it to function as an earth-penetrator.

[26] The countries that are listed in Annex 2 to the CTBT are; Algeria, Argentina, Australia, Austria, Bangladesh, Belgium, Brazil, Bulgaria, Canada, Chile, China, Colombia, Democratic People's Republic of Korea, Egypt, Finland, France, Germany, Hungary, India, Indonesia, Iran (Islamic Republic of), Israel, Italy, Japan, Mexico, Netherlands, Norway, Pakistan, Peru, Poland, Romania, Republic of Korea, Russian Federation, Slovakia, South Africa, Spain, Sweden, Switzerland, Turkey, Ukraine, United Kingdome of Great Britain and Northern Ireland, United States of America, Viet Nam, and Zaire.

CTBT have openly stated that they will not ratify the CTBT. Some of these are India, Pakistan, and North Korea. If, after three years following the treaty being opened for signature, all 44 countries listed in Annex 2 to the CTBT have not ratified the treaty, a new Conference will be held to decide the fate of the CTBT. The nations that have ratified the CTBT prior to the Conference will be invited to attend as full voting members. The countries that have signed but not ratified the CTBT will be able to attend the conference as observers.[27] At the Conference, it will be decided what measures consistent with international law may be undertaken to accelerate the ratification process in order to facilitate the early entry into force of this Treaty. According to the CTBT, "Unless the Conference or other future conferences decide otherwise, this process shall be repeated at subsequent anniversaries of the opening for signature of the treaty, until its entry into force."[28]

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[27] United Nations, Comprehensive Test Ban Treaty, Article XIV, para. 2-4.

[28] Ibid., para 3.

III. UNITED KINGDOM

> The CTBT is a cornerstone of international efforts to prevent nuclear proliferation. Britain's ratification signals our commitment to the goal of a nuclear weapons free world.[29]

Britain has had a long history of cooperating with the United States regarding nuclear issues. This can be seen as one of the major reasons why the United Kingdom decided to switch its stance on the CTBT and support ratification rather than conduct the weapons tests that it had scheduled. From what does this long-term relationship between the United Kingdom and the United States stem? The United States and the United Kingdom worked together in the original development of the nuclear bomb. As the British Ministry of Defense has noted, "Britain was a wartime partner with the United States in the development of nuclear weapons."[30] The United States and the United Kingdom have had a "special relationship" since the early twentieth century. The relationship became closer during World War II. "At the practical base, it consisted of intelligence cooperation at a high level of detail, nuclear cooperation in both the deployment and testing of weapons, and the habits of cooperation and natural closeness born of experience between the three armed services - particularly the respective navies and air forces."[31]

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[29] Robin Cook, British Foreign Secretary, as quoted in the British Foreign & Commonwealth Office, *Background Brief: Comprehensive Nuclear Test Ban Treaty*, London, April 1998.

[30] The Defence Council, *The Future United Kingdom Strategic Nuclear Deterrent Force*, Ministry of Defence, July 1980, p. 2 (3).

[31] Michael Clarke, "Britain" *NATO and Collective Security*, Michael Brenner ed., St. Martin's Press, INC., 1998, p. 10.

As Michael Clarke has pointed out, "There have been times in British political history when security questions have been matters of intense political bitterness, most notable in the late 1940s over the onset of the Cold War and the early 1980s on nuclear issues. A great deal of parliamentary heat has been generated over attitudes to the Russians, nuclear deterrence, and the perceived over-assertiveness of American leadership on all sides of the House of Commons. But with the exception of a relatively brief period from 1981 to 1985, when the Labour Party adopted an outright policy of nuclear disarmament, such debates, heated as they were, have been within rather than between the main political parties. Since 1945, the front benches have been at one in their adherence to NATO, the importance of the American connection, and their general attitude among the party leaders to the relationship with the United States. Leaders of the Labour Party are not generally less committed to the relationship with Washington than those in the Conservative Party. Rather, it has been a matter of circumstance and friendship at the apex of the 'Special Relationship' described above."[32]

Since the end of the Cold War the United Kingdom has taken decisions that have generally paralleled United States policy. One of these was at the end of the Cold War, when Britain was looking to replace the aging WE177 with an air-to-surface missile that would allow strike aircraft to launch at a distance from increasingly capable air defense systems. According to a British Ministry of Defense official, writing in a private capacity,

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[32] Clarke, "Britain" *NATO and Collective Security,* p. 16.

> In parallel with the NATO decision to cut its gravity bomb holdings, the British Defence Secretary announced the halving of the WE177 stockpile. Uncertainty gathered over the future of the air-to-surface missile project until, in October 1993, Defence Secretary Malcom Rifkind announced the provisional decision not to proceed with it.... Barring new circumstances forcing a change of plan, however, British nuclear capability will be vested solely in the new Trident force once the residual WE177 stockpile reaches the end of its serviced life in the first decade of the new century.... There were probably a variety of motives for this series of divestments. As noted above, the United States lead in autumn 1991 [that is, President Bush's decisions to eliminate certain types of United States non-strategic nuclear forces] was important in initiating the process. London no doubt felt predisposed to remain in step with Washington for two reasons: first, because of the historical (and enduring) closeness of the bilateral nuclear relationship under the 1958 United States-United Kingdom Atomic Cooperation Agreement; and second, because of the British reluctance (shared by the French) to become involved in formal arms-control arrangements affecting their national systems.[33]

A second example of the United Kingdom adjusting its policy to be in step with that of the United States concerns the CTBT. The British decided to support the conclusion of a CTBT shortly after the Clinton administration decided to do so. The history of official British attitudes to the CTBT is complex. As Eric Arnett has pointed out, "From the late 1950s to the early 1980s, regardless of which political party was in power, the United Kingdom was a proponent of a Comprehensive Test Ban treaty."[34] In 1980, the British Foreign Secretary stated at the United Nations Association that:

> A CTBT is important for two reasons. First it will curb the development of new and more destructive nuclear warheads, thereby curtailing this aspect of competition in strategic weapons. Secondly, it will demonstrate our good faith towards those countries which, under the NPT, have formally surrendered the right to develop nuclear weapons.... The

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[33] Witney, "British Nuclear Policy After the Cold War," pp. 98-99.

[34] Eric Arnett, *Nuclear Weapons After the Comprehensive Test Ban: Implications for Modernization and Proliferation,* Stockholm International Peace Research Institute, Oxford University Press, 1996, p. 108.

> countries which have signed the NPT expect the Nuclear Weapons States to honor their undertaking to seek an end to nuclear testing.[35]

In the late 1980s and early 1990s, however, the United Kingdom was opposed to concluding a CTBT. William Waldegrave, Foreign and Commonwealth Office Minister at the CD in Geneva, on 15 June 1989, stated:

> An immediate move to a CTB would be premature—and perhaps even destabilizing. In East-West relations security will depend for the foreseeable future on deterrence based, in part, on nuclear weapons. That will mean a continuing requirement to conduct underground nuclear tests to ensure that our nuclear weapons remain effective and up-to-date.[36]

In 1992 the United States limited testing for the British with the moratorium on testing mandated by Congress and reluctantly approved by President Bush. British options were limited because the Nevada test site was the only place where Britain could test nuclear weapons. "In September 1992, Congress, against the wishes of President Bush, enforced a nine-month moratorium on United States nuclear testing, which was intended (at least by Congress) to lead to a complete ban by 1996. Britain would be allowed one test per year up to 1996, and the Pentagon was reported to have made provision for this number (that is three out of 15 in total). The British Embassy lobbied against the moratorium on grounds that 'we still need to carry out our minimum test programme for reasons of safety, reliability and effectiveness'."[37] The 1992 Defence Estimates stated that, "We [Britain] shall continue to conduct only the minimum number of tests necessary and to recognize a comprehensive ban on nuclear tests as a long-term goal."[38] In the House of Lords on 16 November 1992, Minister of Defense Viscount Cranborne said:

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[35] Statement by British Foreign Secretary Lord Carrington at the UN Association of the UK, 24 October 1980, quoted by Patricia M. Lewis, *Nuclear Weapons After the Comprehensive Test Ban,* edited by Eric Arnett, p. 109.

[36] Waldegrave quoted by Patricia M. Lewis, *Nuclear Weapons After the Comprehensive Test Ban,* edited by Eric Arnett, p. 109.

> Any future nuclear testing from now relates not to the safety of the Trident system itself but very much to the safety of future systems and the capabilities of the teams we have in place in this country. For those who have nuclear weapons and use them as a deterrent, these weapons are infinitely safer if there is a testing capacity. It is not so much testing and the detection of test[s] that is the difficulty, it is the acquisition and the proliferation of nuclear weapons, particularly among third world countries, which is a danger.[39]

This statement shows the shift in British thinking away from the CTBT. The British lobbied the Clinton administration to end the moratorium on testing but were disappointed. "On 3 July [1993] Clinton announced that he had decided to maintain the moratorium so long as no other nations tested first. The British were reported to be frustrated, as one test had been ready to go when the moratorium had first been imposed. Three tests were planned, of which one was probably for a single warhead Trident and another was said to be to add safety features to the existing WE177, and now had to be abandoned. Policy shifted towards improving computer simulation capabilities."[40]

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[37] Freedman, "Britain and Nuclear Weapons," p. 229.

[38] *Statement on the Defense Estimates, 1992,* Directorate of Defense Policy, presented to Parliament by the Secretary of State of defense by Command of Her Majesty, London, p. 22 (134).

[39] Cranborne quoted by Patricia M. Lewis, *Nuclear Weapons After the Comprehensive Test Ban,* edited by Eric Arnett, p. 110.

The United States decision tied the hands of the United Kingdom. However, instead of coming out against the United States or linking themselves with the French and using the French test sites, the British changed their position to support that of the United States. In the words of Patricia Lewis, "The British Government under Prime Minister Major has, in public statements, come around to the Clinton Administration's way of thinking and is now, on paper, in favour of a CTB treaty."[41] By 1996, the United Kingdom position, as stated in that year's Defence Paper, was as follows:

> We consider that an effectively-verified Comprehensive Nuclear Test Ban Treaty (CTBT) could play a useful role in the international non-proliferation regime. We are negotiating actively to achieve this goal at the Conference on Disarmament in Geneva and hope that a Treaty can be concluded in the first half of 1996. The United Kingdom has no plans to carry out further nuclear tests. We have also made it clear that we view a CTBT as prohibiting any nuclear weapon test explosion with a nuclear yield, no matter how small the yield.[42]

The United Kingdom and the United States have had a "special relationship" in nuclear matters for many years and the British are evidently not willing to do anything to jeopardize the relationship, even if it means changing the United Kingdom's nuclear testing policy.

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[40] Freedman, "Britain and Nuclear Weapons," p. 230.

[41] Patricia M. Lewis, *Nuclear Weapons After the Comprehensive Test Ban,* edited by Eric Arnett, p. 110.

[42] *Statement on the Defense Estimates, 1992,* Directorate of Defense Policy, presented to Parliament by the Secretary of State of defense by Command of Her Majesty, London, p. 16 (145).

A. SUPPORTERS OF THE CTBT

The shift in the United Kingdom from a policy opposed to signing a CTBT (and committed to conducting future explosive tests) to a policy supportive of a CTBT happened prior to the change in government from the Conservative Party to the Labour Party in May 1997. In 1990, Philip Sabin wrote that "the Labour Party has promised to cease all British nuclear testing and work for a comprehensive test ban."[43] Well before the Labour Party gained a majority in the House of Commons in 1997, however, British policy had shifted. The Conservatives had accepted the CTBT as a near-term political objective after the shift in United States CTBT policy in 1992-93. Prime Minister John Major, the leader of the Conservatives, signed the CTBT for the United Kingdom in September 1996. The Labour government continued British support for a no-test regime. On 6 April 1998, the United Kingdom became the sixth country to ratify the Comprehensive Test Ban Treaty. The parliamentary procedures that led to the ratification were smooth and efficient. The bill that made the ratification of the CTBT possible was the Nuclear Explosions (Prohibition and Inspections) Bill. The Bill was introduced to the House of Lords on 24 July 97. There was no public record made of the committee deliberations of the bill, and none of the three readings of the Bill raised any controversy. The second reading of the Bill was held on 6 November 1997 and the third and final reading was held on 16 March 1998. The Bill went through by acclamation, without a recorded vote, and the Queen gave Her Royal Assent on 18 March 1998. With this legislation, the United Kingdom executive could ratify the CTBT.

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[43] Philip A.G. Sabin, "British Strategic Priorities in the 1990s: Adelphi Papers 254," Winter 1990, Brassey's for the International Institute for Strategic Studies.

B. OPPONENTS OF THE CTBT

Today there are few open opponents of the CTBT in the United Kingdom. This is due to the major opposition being located mainly in the Conservative Party. Until recently it was commonly assumed that the Ministry of Defense (MOD) was against a CTBT while the Foreign and Commonwealth Office (FCO) was in favor as a measure to strengthen the nonproliferation regime. This split has been less and less significant since the 1980s. Recently the MOD has taken control of non-proliferation policy and has resigned itself to the fact that nuclear weapons testing has, to all intents and purposes, stopped for good.[44]

However, there are still many questions that need to be answered. Some of the questions that were raised during the debates in the House of Lords are indicative of what had in the past been the differences between the opponents and supporters of the CTBT. In the first debate in the House of Lords three main questions were raised: ratification, the wider issues of disarmament, and the lack of sincerity of purpose within the international community. The most important question that was raised by Lord Moynihan in July 1997 was whether the United States would ratify the treaty.[45] At this time it seemed that ratification by the United States was possible. However, prospects for ratification by India, Pakistan, and North Korea were stated to be very slim.

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[44] Eric Arnett, *Nuclear Weapons After the Comprehensive Test Ban,* p. 111.

[45] *Parliamentary Debates*, Lords, 786 LD40-PAG1/22, col. 1547.

The second question dealt with the Indian and Pakistani complaints that the CTBT did nothing to carry forward nuclear disarmament by the nuclear weapon states. This was about a year before the May 1998 nuclear tests by India and Pakistan. This question is still valid. The CTBT does not stop future weapon production and only prohibits nuclear explosive tests. In fact, David Heath, a Liberal Democrat Member of Parliament, asked, "Is there is no scope within the treaty for a commitment not to work on qualitative improvements to nuclear technology, and should not the British Government pursue that as a future objective? It is absent from the treaty, but it is likely to undermine the confidence of non-nuclear powers if they are aware of further improvements in nuclear weapons technology made by the nuclear powers, yet outwith [that is, outside] the terms of the treaty."[46]

Another question that was raised during the limited debates on the CTBT was that of the future of computer simulations. Some Members of Parliament said that only America has the computer technology necessary to simulate testing and ensure proper maintenance. This implied that Britain's independent deterrent depends on United States technology. In response, Andrew Tyrie, a Conservative Member of Parliament, stated, "I think that I am right in saying that our nuclear weapons would be targeted from Omaha and to all extents and purposes, co-operation would be required with the Americans for our missiles to be successfully launched and delivered to their targets. In those circumstances, the idea of total independence is a fiction."[47] This was one of the most powerful statements in the Nuclear Explosions Bill debate. Andrew Tyrie even declared that since the future of the United Kingdom's nuclear arsenal was not really in the hands of the United Kingdom, then it could do no harm to ratify Britain's accession to the CTBT. As long as the United States maintained the delivery systems for the British, it was argued, they would not lose any of their deterrent's technical credibility.

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[46] *Parliamentary Debates*, Commons, 246 CD62-PAG1/36 col. 462-463.

C. THE SITUATION SINCE THE APRIL 1998 RATIFICATION OF THE CTBT

> The Comprehensive Test Ban Treaty is the culmination of almost 40 years of effort involving painstaking negotiations. When the parties to the Non-Proliferation Treaty agreed [to] a set of principles and objectives in 1995, they described a comprehensive test ban treaty as the next step on the road to nuclear disarmament... the Treaty will constrain the development and quantitative improvement of nuclear weapons and end the development of advanced new types. That is truly an important step forward.[48]

Since the ratification of the CTBT, the United Kingdom has opened the doors of its nuclear weapons establishment. The new Strategic Defence Review was published on the Internet for everyone to read. This document shines a new light on British nuclear history. The Strategic Defence Review states that "Britain continues to require a credible and effective minimum nuclear deterrent based on the Trident submarine force. This has provided Britain's only nuclear system since the withdrawal of the last of the Royal Air

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[47] *Parliamentary Debates*, Commons, 246 CD62-PAG1/35 col. 462.

[48] Tony Lloyd, Minister of State, Foreign and Commonwealth Office, 6 November 1997, as quoted in the British Foreign & Commonwealth Office, *Background Brief: Comprehensive Nuclear Test Ban Treaty*, London, April 1998, p. 1.

Force (RAF's) free-fall nuclear bombs earlier this year, performing both the strategic and sub-strategic role."[49] The document goes on to state the exact size of the British nuclear arsenal. "We have also taken an initiative to increase openness about our nuclear capabilities by releasing details of our defence stocks of plutonium and highly enriched uranium."[50] It states the maximum number of warheads that will be deployed on each Trident submarine (that is, 48 warheads).[51] The Strategic Defence Review also pledges to open up the archives of the United Kingdom's nuclear program.

This new openness in the United Kingdom is in keeping with its ratification of the CTBT. In a background brief published by the Foreign and Commonwealth Office, Britain's role in the future of the CTBT was stressed.

> Britain's national research programme, established in the early 1960's, to study means of detecting and verifying nuclear explosions, enabled her to play a major role in the negotiations on the CTBT verification system. It continues to enable her to make a significant contribution to current efforts in Vienna to achieve the Treaty's entry into force. Britain will retain a national capability to allow her to reach an independent judgement on the data produced by the IMS [International Monitoring System]. Once the Treaty enters into Force, this will strengthen her ability to justify any request, if needed, for an OSI [On-Site Inspection] to investigate a suspicious event.[52]

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[49] Ministry of Defence, *Strategic Defence Review*, London, July 1998, Nuclear Deterrent Annex, p. 1.

[50] Ibid., p. 1.

[51] Ibid., p. 5-2, para. 9 says that Britain will deploy 48 warheads per SSBN and that Britain will maintain fewer than 200 operationally available nuclear warheads.

[52] Foreign and Commonwealth Office, the United Kingdom, *Comprehensive Nuclear Test Ban Treaty*: Background Brief, London, April 1998, p. 6.

Indeed, during the debate on the Nuclear Explosions Bill, Britain's future role in inspections and international monitoring was stressed. Derek Fatchett, the Minister of State, Foreign and Commonwealth Office, in response to a question from David Faber (a Conservative Member of Parliament) stated that:

> The United Kingdom's contribution is significant: the existing seismic array at Eskdalemuir in the United Kingdom; the radionuclide stations in the British Indian Ocean Territory, St. Helena, Tristan da Cunha, Halley island and Antarctica and a radionuclide laboratory in the United Kingdom: hydroacoustic stations in the British Indian ocean territory and in the British Indian ocean territory and in Tristan da Cunha; and infrasound stations in the British Indian Ocean Territory, Tristand da Cunha, Ascension island and Bermuda. We are making a substantial contribution towards monitoring.[53]

Another reason that future testing is not needed in the United Kingdom is that the only nuclear weapon type that the United Kingdom will have is the warhead for the Trident missile. Because the Trident warhead is currently in production in Britain, the United Kingdom could extend the production indefinitely to guarantee that it has a reliable weapon. This could be done, it is argued, without the need for future testing. Old warheads could be dismantled and retired and new ones put into place with minimal safety and reliability concerns, according to some observers. Since the United Kingdom has stated that the Trident missile will be the only nuclear weapon system that Britain will need in the foreseeable future, no new development or testing is necessary. For these reasons, London has argued, the United Kingdom has been able to lead the way in establishing the CTBT without jeopardizing any of its own national security goals. The fact that Britain currently has functioning weapons facilities must add to the confidence that the United Kingdom has in its nuclear arsenal.

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[53] *Parliamentary Debates*, Commons, 542 CD139-PAG1/56, col. 1057.

However, since the ratification by Britain of the CTBT, nuclear testing has occurred in India and Pakistan. The background brief prepared by the Foreign and Commonwealth Office to support the ratification of the CTBT clearly stated that one of the main reasons that the United Kingdom should ratify the CTBT was that it would "establish an international political norm against testing."[54] Clearly this has not happened. What has been considered to be a "global norm" by the United Kingdom and most of the rest of the West was found to be less than entirely global, at least in South Asia. This, however, has not caused the United Kingdom to rethink its position on the CTBT. The Trident is still an adequate nuclear deterrent for the United Kingdom, and the CTBT will not affect that in the foreseeable future.

What is more important than the tests in India and Pakistan to the United Kingdom is the position of the United States. The shifting views of the United States towards the CTBT are discussed in the following chapter. This chapter began by describing the "special relationship" between the United States and the United Kingdom. If the United States does not follow Britain's lead and ratify the CTBT (if history proves to be any indication of the future), the United Kingdom may find a way to take back its commitment to the CTBT. This may not be necessary if the CTBT never enters into force. However, the United Kingdom's position at the Entry Into Force Conference in

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[54] Foreign and Commonwealth Office, the United Kingdom, *Comprehensive Nuclear Test Ban Treaty*: Background Brief, London, April 1998, p. 5.

1999 may be different from that held by the United States if the United States is not a voting participant in that conference, and only an observer.

IV. UNITED STATES

The separation of the executive and legislative branches of government in the United States encourages heated debates between these branches, in contrast with the parliamentary system in the United Kingdom. It is rare that legislation is passed in the United States as easily as the CTBT was ratified in the United Kingdom. Currently there is a debate in Congress about whether to support the Administration's goal of ratifying the CTBT. There are strong protagonists on both sides of the United States CTBT debate. In January 1998, Senator Jesse Helms, the Chairman of the Senate Foreign Relations Committee, vowed to the President that there would be no action on the CTBT until other treaties, including amendments to the Anti-Ballistic Missile (ABM) Treaty, had been acted on. Given that the President had declared that the CTBT was one of his priorities, and the ABM Treaty amendments were not, this was in effect a way to delay action on the CTBT. Owing to this stalemate, United States Senate action on the CTBT is still pending. This chapter analyzes the principal arguments of CTBT proponents and opponents in the United States.

A. PROPONENTS OF CTBT RATIFICATION

At the present time, the main supporter of the CTBT in the United States is President Clinton. According to John Edwards, the United States government agencies most supportive of the CTBT are "the Arms Control and Disarmament Agency and the State Department, sometimes supported by the Central Intelligence Agency. Over the years they have been joined by increasing numbers on Congressmen and by scientists who contest the technical arguments of the laboratory directors."[55] Proponents have different reasons for supporting the CTBT. The Administration has advanced the following main points for why the CTBT should be ratified, arguing that the CTBT would:

> Constrain the development and qualitative improvement of nuclear weapons, end the development of advanced new types of nuclear weapons, contribute to the prevention of nuclear proliferation and the process of nuclear disarmament, [and] strengthen international peace and security.[56]

The case for the CTBT includes three other arguments. The first is that the greatest need is to reduce the attractiveness of nuclear weapons for all nations. The signing of a CTBT will, it is argued, establish an international norm. The second argument is that adequate verification of a CTBT can now be assured, and the international community is ready to make the necessary arrangements to support the verification regime. The third argument is that the safety and reliability of nuclear weapons can be assured by non-explosive means on a permanent basis.

In addition, as a response to one of the concerns expressed by opponents of the CTBT, proponents add that the possible erosion of the expertise of the technical staff formerly employed in testing-related activities is not a valid reason to oppose the CTBT. The need to maintain the expertise of technical staff working on nuclear weapons programs can not determine policy on an issue of such importance, they argue, because there are more peaceful challenges these experts are well qualified to be working on.

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[55] John Edmonds, *A Complete Nuclear Test Ban – Why has it Taken so Long?* Council for Arms Control, London, U.K., SAGE Publications, Security Dialogue, 1994, Vol. 25(4), pp. 375-388.

[56] The White House, *Comprehensive Test Ban Treaty*, 11 September 1996, found online at http://www.acda.gov/factshee/wmd/nuclear/ctbt/ctbtfs.htm

The first argument urges the necessity of creating an international norm against testing. Tom Zamora Collina, Director, Arms Control and International Security Program of the Union of Concerned Scientists, states:

> A CTBT alone will not eliminate the possibility of proliferation, but it does establish an international norm, which if violated will result in significant political costs. Although relatively simple, singe-stage nuclear weapons can be built without nuclear tests, a CTBT would make it extremely difficult for new nuclear nations to gain confidence in more sophisticated (smaller, lighter) two-stage thermonuclear weapons that could be more easily delivered by ballistic missiles and thus pose a greater threat to the U.S.[57]

Arms Control Association President and Director Spurgeon M. Keeny, Jr. agrees with Collina's position. Keeny states that the CTBT will constrain "rogue" states' nuclear weapons development and other states' nuclear capabilities.

> The treaty cannot by itself, however, prevent such states from obtaining a first generation nuclear weapons capability. When the CTBT enters into force with essentially worldwide support, including the five nuclear-weapon states, an international norm against testing will have been established. While this could not prevent testing by a rogue state, the act of testing would, by violating a universal norm, put that state at odds with the entire international community and make it a prime candidate for serious sanctions.... Such a rogue state would not, however, be able to go very far in optimizing and miniaturizing fission weapons, and would certainly not be able to develop thermonuclear weapons without extensive testing or access to detailed plans and direct technical assistance from a nuclear-weapon state that had successfully developed and tested them.[58]

All supporters of the CTBT state that the establishment of an international norm against the explosive testing of nuclear weapons is desirable. Their reasons for favoring such a norm include environmental concerns and the halting of nuclear proliferation. The value of such an international norm is taken for granted. Prior to the May 1998 nuclear explosive tests by India and Pakistan, it was stated that a norm against testing had already been established. This, however, proved not to be universal.

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[57] Tom Zamora Collina, *The Test Ban and Stock pile Stewardship: A Response to Chairman Spence,* A Coalition to Reduce Nuclear Dangers Report, June 1997, p. 9.

[58] Spurgeon M. Keeny, "The CTB Treaty and Nuclear Non-Proliferation: The Debate Continues," *Arms Control Today*, March 1998, p. 8.

The second argument advanced by CTBT proponents is that the treaty is verifiable and that its ratification will help to set up even more stringent measures to monitor the international scene. Robert Bell, special assistant to the president for national security affairs at the National Security Council; Charles Curtis, former undersecretary and deputy secretary of energy and a member of the Nuclear Weapons Council from 1994 to 1997; Richard Garwin, a long-time consultant on nuclear weapons and national security who is Thomas J. Watson Fellow Emeritus at IBM Research Laboratories; and Lynn Sykes, Higgins Professor of Earth and Environmental Sciences at Columbia University and a leading expert on seismic detection of underground nuclear tests, all maintain that the CTBT is verifiable.[59] Richard Garwin states that:

> As for verification of a CTBT, the U.S. should not sign a treaty for which it cannot adequately verify the compliance of the other participants. The CTB Treaty creates an international monitoring system that is augmented by unilateral intelligence capabilities. The word "adequate" is an important qualifier in assessing arms control treaties, emphasized by Paul Nitze as relating to militarily significant violations of a treaty. The four components of the treaty's international monitoring system provide confidence that we will be able to detect a 1-kiloton nuclear explosion on Earth, and the capability is much better in the vicinity of the declared test sites of the nuclear powers. Furthermore, it should be expected that the U.S. would focus additional resources to augment this international system.

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[59] "The Issues Behind the CTB Treaty Ratification Debate," *Arms Control Today*, October 1997, pp. 6-13.

> An additional deterrent to non-compliance is posed by the on-site inspection rights under the treaty, which allow for the inspection, in some cases, of the radioactive gases leaking from an underground nuclear test. That the CTBT bans activities that cannot be detected by the system is not a weakness of the treaty but a strength.[60]

The third reason why proponents of the CTBT say the United States should ratify the CTBT is that the safety and reliability of United States nuclear weapons can be assured by non-explosive means. On 12 February 1998, the President forwarded the annual certification from the Secretaries of Defense and Energy that the nuclear stockpile remains safe, secure, and reliable.[61] Such a certification to the President has been provided annually since the last nuclear explosive test in 1992. In their Memorandum to President Clinton, Secretaries William Cohen and Federico Peña wrote:

> In response to your direction to conduct an annual certification of the nuclear weapons stockpile, we have thoroughly reviewed the safety and reliability of the stockpile under the Comprehensive Test Ban Treaty. The nuclear stockpile has no safety or reliability concerns that require underground testing at this time. Problems that have arisen in the stockpile are being addressed and resolved without underground nuclear testing to ensure the stockpile remains safe and reliable. In reaching this conclusion, we have obtained the advice of the Directors of the National Weapons Laboratories, the Commander in Chief, United States Strategic Command, and the Nuclear Weapons Council. We will continue to inform you annually on the safety and reliability of the nuclear weapons stockpile in the absence of underground nuclear testing, and in the context of the DOE's Stockpile Stewardship and Management Plan.[62]

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[60] Ibid., p. 9.

[61] The White House, *Nuclear Stockpile Certified Safe, Reliable,* Comprehensive Test Ban Treaty: Test Ban News, 12 February 1998, found online at http://www.adca.gov/ctbtpage/tbn06.htm

[62] Ibid.

Peña, in his Press Club remarks at the release of the certification, left open the possible future necessity for testing.

> Stockpile stewardship is working. And working so well, that I am pleased to announce that today, President Clinton will forward to Congress the annual certification from the Secretaries of Defense and Energy that the nuclear stockpile remains safe, secure, and reliable, and that there is no need to return to nuclear testing at this time.
>
> Secretary Cohen and I have given the President our full assurance that we have conducted a painstaking and thorough review of every weapon type in the stockpile. And we undertake this review from the bottom up. From the technicians who work every day with the weapons, to the scientists who designed the weapons, to the directors of our three weapons laboratories, John Browne, Paul Robinson, and Bruce Tarter, to the Commander of U.S. Strategic Command, General Habiger.
>
> But I want to make one thing absolutely clear. If, in the future, Secretary Cohen and I, or our successors, ever had to inform the President that we could no longer certify the safety and reliability of a nuclear weapon type with high confidence... in that circumstance, the President would be prepared to withdraw from the treaty in order to conduct whatever testing might be required. And I would not issue my written certification to the President if I could not state, with absolute certainty, that the weapons in our stockpile remain safe, secure, and reliable each year.[63]

Finally, although not strictly a CTBT issue, the argument raised to counter concerns about maintaining the expertise of the technical staff working on nuclear weapons programs under a no-test regime should be noted. The supporters of the CTBT contend that the risk that the expertise of technical staff working on nuclear weapons programs might be lost in a test-free world is not significant, because there are other technical and scientific challenges that these experts are well qualified to work on.

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[63] Prepared remarks for U.S. Secretary of Energy, Federico Peña regarding the Comprehensive Test Ban Treaty, National Press Club, Washington, D.C., 12 February 1998, found online at: http://www.acda.gov/ctbtpage/spee_pg.htm

Moreover, most of the scientific and technical experts are still working on nuclear weapons programs under the SSMP. One of the goals of the SSMP is to foster research in nuclear-related fields so that the knowledge and know-how are not lost. According to Richard Garwin,

> The United States has, in its Stockpile Stewardship and Management Program, adopted a very aggressive program for the maintenance of its nuclear arsenal and its nuclear expertise. This program involves a range of activities such as the Accelerated Strategic Computing Initiative, greater involvement of weapon designers with the detailed results of the stockpile surveillance program, and the building and operation of major new facilities for improved experimental observation of aspects of nuclear weaponry without nuclear explosion testing. These activities primarily support the second of six safeguards set forth by President Clinton in his September 22 "Letter of Transmittal" of the CTB Treaty to the Senate (the maintenance of modern nuclear laboratory facilities and programs). Thus, a large part of the stewardship program has the goal of maintaining nuclear weapon expertise and the weapon establishment's ability to design, test, manufacture and certify new nuclear weapons if the CTB Treaty era should come to an end.[64]

Supporters of the CTBT maintain that it is in the national and international interest. They note that the United States could always end its commitment to the CTBT if it determined that it was in its supreme national interest to do so. They contend that there are no doubts about the safety and reliability of the United States nuclear arsenal. In their view the CTBT is verifiable. The support of the United States is needed to create an international norm, they note. Moreover, they contend that the treaty will promote the long-standing non-proliferation goals of the United States.

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[64] Richard L. Garwin, "The Future of Nuclear Weapons Without Testing," *Arms Control Today*, November/December 1997, pp. 7-8.

B. OPPONENTS OF CTBT RATIFICATION

1. Risks of the Stockpile Stewardship Maintenance Program

According to opponents of the CTBT, one of the major risks of the SSMP is that it relies heavily on computer simulations for information that was once gleaned from tests. The first problem with this is that the computers and the programs to simulate nuclear explosions have yet to be developed. The second problem is that once these computers have been built and the programs have been developed, under the CTBT, there will be no way to conclusively test them against a real nuclear explosion. CTBT opponents argue that confidence in the reliability and perhaps even the safety of the nuclear stockpile will therefore decline. This is not the first time in history that computer simulations have been relied upon to maintain nuclear weapons during a no-test period. In 1958-1961 the United States and the Soviet Union observed an unwritten agreement not to test nuclear weapons. The results of the moratorium on testing included weapon programs that had numerous problems and some that failed.[65] According to a 1986 report by the Lawrence Livermore National Laboratory,

> Nonnuclear tests and computer simulations are very valuable tools, but there is no substitute for the experimental data from nuclear tests. In many instances, weapons scientists must rely on technical judgement to make decisions regarding problems that arise in the stockpile, in recommending changes in weapon systems, and in developing new warheads—judgement that can only derive from and be refined with actual data from nuclear tests. The importance of nuclear testing was illustrated by our experiences with the test moratorium of 1958-1961. Without nuclear testing,

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[65] *Nuclear Weapon R&D and the Role of Nuclear Testing,* Energy and Technology Review, Lawrence Livermore National Laboratory, September 1986.

> deterrence would still be based on nuclear weapons but at significantly higher cost and with greater uncertainty.[66]

Britain provides a second example of the impact of refraining from explosive testing. Britain's experience during its testing moratorium from 1965 to 1974 offers a critical example of what can happen in such circumstances.

> During the moratorium, the British relied primarily on computer simulation to provide the information they needed concerning their arsenal. However, the advent of ballistic missile defense (BMD) using nuclear weapons on interceptors changed the requirements; the British feared that their warheads would be vulnerable to such nuclear explosions, thus forcing them to design new warheads to meet the new and more demanding environment. Under the 1958 United States-British nuclear cooperation agreement, the British revealed to the United States their initial concepts for a new warhead design that was derived solely on the basis of computer simulation. However, United States weapons designers, who had already had the benefit of testing warheads under conditions simulating the environment of nuclear BMD forces, concluded that there were performance deficiencies in the British warhead design. The British database lacked the new and critical insight that American testing had provided during the British moratorium. Most experts agree that new designs to increase performance require testing, but is it also true that the United States can maintain an enduring stockpile without the benefit of nuclear test explosions?[67]

When asked about computer simulations, Robert B. Laughlin, a professor at Stanford University who has worked on bomb-related physics at the Lawrence Livermore National Laboratory since 1981, said that "computer programs can only simulate the stuff you know. Suppose you left a personal computer out in the rain for a year. Is there a program that can tell you whether it will still run? Of course not—it all depends on what happened to it."[68] In his view, the same principle applies to nuclear warheads: "Changes happen over time that you are not sure how to measure. Some matter, some don't. The problem is the things you didn't think to put in the simulation."[69]

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[66] Ibid., p. 18.

[67] Harold P. Smith, Jr. and Richard S. Soll, "Challenges of Nuclear Stockpile Stewardship Under a Comprehensive Test Ban," *Arms Control Today*, March 1998, p. 4.

Another limitation of computer simulations is that the computer will only perform as programmed. The scientists at the national laboratories admit that they do not fully understand what happens in a nuclear explosion. They state that that is the reason for conducting sub-critical explosions. The knowledge of how a nuclear bomb explodes can be likened to baking a cake. If one has the recipe, all the right ingredients and the correct oven, one can bake a delicious cake repeatedly. This recipe-like data is the information that the weapons laboratories have. What they do not know is what actually happens inside the oven. What chemical changes occur in the ingredients that produce a cake? This information is vital to building computers and designing simulations. Without it, the programs will be flawed. When programs are finally developed to simulate this knowledge that has not yet been discovered, CTBT opponents point out, there will be no way to test them if the United States has ratified the CTBT.[70]

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[68] Robert B. Laughlin, as quoted by W. Wayt Gibbs in "Computer Bombs: Scientists debate U.S. plans for "virtual testing" of nuclear weapons," *Scientific American*, Issue 3/97.

[69] Ibid.

[70] *Nuclear Weapon R&D and the Role of Nuclear Testing,* Energy and Technology Review, Lawrence Livermore National Laboratory, September 1986, p. 17.

2. Nuclear Production/Manufacturing Issues

One of the core arguments of CTBT opponents is that nuclear production and manufacturing would be critically harmed by the CTBT. Harold H. Agnew, the former Director of the Los Alamos National Laboratory, has assessed the consequences of an absence of nuclear explosive testing as follows:

> If one assumes that there indeed will no longer be a requirement for any new U.S. bomb or warhead systems, that all stockpiled systems have been tested with regard to their performance and safety, and that we know all we need to know about effects, then why should anyone worry about a CTB? The answer is that some of the conditions imposed on the weapons development community cannot be achieved without testing. One of these conditions is to maintain a nuclear weapons design capability, another is to maintain the ability to test, another is to guarantee the credibility of the deterrent. (After an extended time, will the weapons still operate?)
>
> In my opinion, without some form of testing, it will be difficult to fulfill any of the above conditions after some number of years (5 to 10) with the same high confidence as in the past. Presently we have no capability to manufacture plutonium components or to produce tritium. To maintain the stockpile, tritium production is absolutely critical. As the stockpile deteriorates over time, the ability to replicate components will also be critical. But the question will arise as to whether the "new" components will behave as did the original ones. Some degree of actual integral system tests will be required to maintain the present confidence in the stockpile.[71]

Questions have arisen as to the current status of the nuclear stockpile and the lack of production capabilities in the United States.

> The U.S. manufacturing complex is no longer able to support the serial production of nuclear weapons. As a result, there is no immediately available hedge against the failure of an individual weapon type. This risk can be mitigated to some degree by retaining weapon types withdrawn

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[71] Harold M. Agnew, "Nuclear Weapon Testing," *Perspectives on Policy and Strategy*, edited by Patrick M. Cronin, *Strategic Review*, Winter 96, Vol. XXIV no. 1, p. 73.

from the active stockpile as a form of reliability reserve, or "virtual manufacturing."[72]

The ability to produce nuclear weapons is an important hedge against the failure of a specific weapon type in the nuclear stockpile. Because this capability has not been retained, the United States has put itself in a relatively precarious position. If CTBT ratification hindered the certification of new production lines, the problems could be compounded. The retention in storage of some nuclear weapon types being withdrawn from the active inventory could diminish the risk without the cost of retaining a serial production capability. However, this is not being done either.[73]

3. No Bar to Proliferation--Can't be Effectively Verified

Opponents and supporters of the CTBT agree that the CTBT will not stop countries from developing nuclear weapons. Kathleen Bailey states that "the CTBT will not meaningfully constrain nations that want to acquire a workable nuclear weapons design. A state that wants to produce a nuclear weapon can do so without nuclear testing. ...the Hiroshima bomb as well as South Africa's arsenal were untested devices. Furthermore, non-boosted, implosion-type weapons may be designed with high confidence, without testing."[74]

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[72] National Defense University, *U.S. Nuclear Policy in the 21st Century: A Fresh Look at National Strategy and Requirements*, Executive Report, July 1998, p. 21, found online at http://www.ndu/inss/ccp/nucpolicy/nucpolicy.html

[73] Ibid.

[74] Kathleen C. Bailey, "The CTB Treaty and Nuclear Non-Proliferation: The Debate Continues," *Arms Control Today*, March 1998, p. 7.

As far as verification is concerned there are two major flaws. Kathleen Bailey explained both of these when she testified before the Governmental Affairs Subcommittee on International Security, Proliferation and Federal Services.

> However—and this is a very important point—a nation may conduct nuclear tests evasively which would allow several kilotons to be tested with little or no risk of detection. One method by which this might be done is decoupling—that is, detonation of the device in a cavity that can reduce the seismic signal by as much as a factor of 70. This means, for example, that a kiloton explosion would be made to look seismically like a 14-ton explosion fully coupled. A 10-kiloton explosion would look like a 0.14-kiloton explosion.
>
> Now, in his testimony, John Holum [acting undersecretary of state and director of the Arms Control and Disarmament Agency] said that decoupling was a sophisticated measure, [and] that it would be difficult for countries to achieve. That is patently untrue. I would like to quote from a document that I got recently—an unclassified intelligence community report. It says, "The decoupling scenario is credible for many countries for at least two reasons: first, the worldwide mining and petroleum literature indicates that construction of large cavities in both hard rock and salt is feasible, with costs that would be relatively small compared to those required for the production of a nuclear device; second, literature and symposia indicate that containment of particulate and gaseous debris is feasible in both salt and hard rock."
>
> So I would suggest to you that decoupling is not a terribly big challenge and that it is quite a feasible scenario.
>
> However, let's assume that the country is unable to get a large cavity and is not able to decouple its device. What can it do? Well, I would suggest that one of the easiest things to do would be to put the device that it wanted to test on a barge, send it out to the ocean, let the detonation occur, and wait for the International Monitoring System and The New York Times and CNN to tell them what the yield was. That test would be very difficult to attribute, and perhaps impossible.

> So the bottom line is that this comprehensive test ban is not effectively verifiable, and militarily significant testing can take place with very little or no risk of detection.[75]

Kathleen Bailey has thus summed up the non-proliferation and verification problems with the CTBT. Harold Agnew has advanced similar arguments: "A CTB is believed by some to be an important factor in non-proliferation. I personally don't believe so. If a nation has the capability and wants a nuclear device, it will develop one. If not, it won't.... If the point of a CTB is to convince the rest of the world that the nuclear powers have indeed stopped adding new warheads, then there is perhaps another path we might follow which would maintain the credibility of the deterrent and maintain the ability to test."[76]

C. CURRENT PROSPECTS FOR CTBT RATIFICATION

Within the United States the current prospects for CTBT ratification appear doubtful before the year 2000. The CTBT has been in the Senate Foreign Relations Committee since its transmittal by President Clinton for the advice and consent of the Senate. On 21 January 1998, Senator Jesse Helms, the chairman of the Foreign Relations Committee, sent President Clinton a letter stating the agenda for the upcoming year in the Committee. This letter stated that there were more pressing issues for the Senate to consider than a CTBT.

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[75] Ibid., pp. 10-11.

[76] Harold M. Agnew, "Perspectives on Policy and Strategy," edited by Patrick M. Cronin,. *Strategic Review*, Winter 96, Vol. XXIV no. 1, p. 73.

> .... [S]ome in your Administration have indicated that the White House will press the Senate for swift ratification of the Comprehensive Test Ban Treaty (CTBT), immediately following the vote on NATO expansion.
>
> Such a deliberate confrontation would be exceedingly unwise because, Mr. President, the CTBT is very low on the Committee's list of priorities. The treaty has no chance of entering into force for a decade or more. Article 14 of the CTBT explicitly prevents the treaty's entry into force until it has been ratified by 44 specific nations. One of those 44 nations is North Korea, which is unlikely to ever ratify the treaty. Another of the 44 nations – India – has sought to block the CTBT at every step: vetoing it in the Conference on Disarmament so that it could not be submitted as a Conference document. India has opposed it in the United Nations. And, India has declared that it will not even sign the treaty.[77]

Senator Helms has succeeded in blocking any action on the CTBT, and no action is likely as long as he is the Chairman of the Foreign Relations Committee. The committee took no action on the CTBT in 1997 or 1998.

There is still a chance that the CTBT will be considered during 1999. The entry into force provisions of the CTBT call for a "Conference of the States that have already deposited their instruments of ratification upon the request of a majority of those states" if the Treaty "has not entered into force three years after the date of the anniversary of its opening for signature." Most observers think that the conference to review the CTBT will be held in September 1999. There was some debate about the precise meaning of the phrase "three years after the date of the anniversary." Some of the participants thought this meant four years, but the drafters – including the government of Canada – said the intent was three years, and most observers now believe that the conference will take place in 1999. This means that if the United States wants to actively participate in the Entry-Into-Force Conference, the United States must ratify the treaty.

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[77] Senator Jesse Helms, Letter to President Clinton, 21 January 1998.

This situation is not unlike the circumstances that delayed consideration of the Chemical Weapons Convention (CWC) in 1996 and pushed the debate and final approval into 1997. This action came only days before the convention was to enter into force. According to an assessment of the Senate deliberations by Daryl Kimball, "Senator Helms, in his role as chairman of the Foreign Relations Committee, was in fierce opposition to the CWC and his linkage of the treaty's consideration by his committee to unrelated 'Republican priorities' – including the same ABM Treaty and missile defense issues – prevented the committee from ever 'reporting out' the accord."[78] It was only after Senator Trent Lott, as Senate majority leader, reached a unanimous consent agreement with the Democratic Leadership and the White House that the CWC was released from the Foreign Relations Committee and was scheduled for a vote. "Following Republican presidential candidate Bob Dole's last minute announcement that he was dropping his opposition to the treaty and now favored its approval—the day before the floor vote—the Senate gave its advice and consent to ratification in a 74-26 vote. In the end, even Lott supported the treaty, citing the 'real and lasting consequences' of a United States failure to ratify and that 'the credibility of commitments made by two presidents, one Republican and one Democrat, is at stake.'"[79]

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[78] Daryl G. Kimball, "Holding the CTBT Hostage in the Senate: The 'Stealth' Strategy of Helms and Lott," *Arms Control Today*, June/July 1998, online at http://www.clw.org/pub/clw/coalition/act98dk.htm

[79] Ibid.

With the CTBT Entry-Into-Force Conference on its way, Senator Lott may again be pressured by the White House and supporters of the CTBT to force Senator Helms to release the CTBT to a Senate vote. "While the absence of a clear deadline for action on the CTBT hindered efforts to secure Senate hearings and a vote, the convening of a special conference by states-party to the CTBT as soon as September 1999 may provide the impetus necessary to force Senate action on the treaty."[80]

Another factor that may move the Senate into action is a strong move by India or Pakistan. One way that India and Pakistan could provide this move would be to sign the CTBT. This is not entirely improbable, as Senator Edward Kennedy (D-Massachusetts) noted in September 1998,

> On Wednesday, [23 September 1998], at the United Nations, Prime Minister Nawaz Sharif of Pakistan announced his intent to sign the test ban treaty within the next year. The Prime Minister linked this decision to the lifting of sanctions imposed in the wake of last May's nuclear tests. Yesterday [24 September 1998], India's Prime Minister Vajpayee followed suit and announced to the United Nations General Assembly that his nation would also sign the Treaty within the year.[81]

This, however, is still to be seen. Furthermore, Senator Helms has pointed out that a blockage by North Korea would halt the entry into force of the CTB. Pyongyang's ratification of the treaty remains unlikely, so Helms may choose not to move to a vote or debate on a treaty that would never enter into force.

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[80] Ibid.

[81] Senator Edward Kennedy, statement on the Senate floor, 25 September 1998, as found online at http://www.cls.org/pub/clw/coalition/092498.htm

Senator Helms and Senator Lott may nonetheless be persuaded to relent in other ways. Senator Helms has indicated that working on the CTBT is a waste of time and effort while there are more pressing issues, such as the amendments to the ABM Treaty. "Though its chances in the Duma look remote now, if Russia finally approves START II the Clinton administration will likely transmit the ABM Treaty protocols to the Senate, meeting Helms' key prerequisite for CTBT consideration."[82] In the absence of Foreign Relations Committee hearings and a commitment to a vote on the CTBT, senators supportive of the test ban could, at some point, hold up Senate business until the Senate agrees to schedule a vote on the CTBT. This has been done in the past. It was in this manner that the Senate leadership finally agreed to debate and vote on START II ratification in January 1996.

These are all possible ways in which the United States Senate would be able to act on the CTBT. However, each would call for some strong actions by Senators. Unless it can be proved to the Senators that the CTBT could indeed enter into force, it looks doubtful that any member would support such strong actions. Perhaps the only way that action will be taken on the CTBT will be under pressure, shortly before the Entry-Into-Force Conference. However, it is still unclear what that action will be—i.e., whether the Senate would support or reject a resolution of ratification.

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[82] Daryl G. Kimball, "Holding the CTBT Hostage in the Senate: The 'Stealth' Strategy of Helms and Lott," *Arms Control Today*, June/July 1998, p. 11. online at http://www.clw.org/pub/clw/coalition/act98dk.htm

V. ANALYSIS AND CONCLUSION

A. COMPARISON OF THE UNITED KINGDOM AND THE UNITED STATES POLICIES

There are major differences in the circumstances leading up to the ratification of the CTBT by the United Kingdom and the current situation in the United States. The first difference is that the United Kingdom has a functioning nuclear warheads production complex. The British are still manufacturing warheads to be mounted on the Trident missile. In the United States, however, no production lines for the plutonium pits used in weapon primaries have been in operation since the 1989 shutdown of the Rock Flats facility. The United States will also have no dedicated means of producing tritium until 2005, and this may be an optimistic estimate. Civilian reactors could be used to produce tritium, even though it has always been United States policy not to mix civilian and military nuclear programs. This is the current DOE plan. However, South Carolina has proposed that a dedicated tritium production plant be built within its state borders, even though this solution would take longer than relying on civilian reactors as a source of tritium.[83] Lawsuits to stop the production of tritium could also delay production.

Britain's nuclear weapons program relies on a single relatively new delivery system, the Trident missile. This United States-manufactured missile is still in active production. The United Kingdom has stated that the Trident will fulfill all of its foreseeable nuclear security needs until at least the 2020's. The United States has committed itself to maintaining numerous delivery systems and warhead types in operation. The United States has also stated that it plans to continue nuclear research. According to President Clinton, one of the key safeguards in the SSMP will be "the maintenance of modern nuclear laboratory facilities and programs in theoretical and exploratory nuclear technology that will attract, retain, and ensure the continued application of our human scientific resources to those programs on which continued progress in nuclear technology depends."[84] It can be inferred from this statement that new research will be conducted to maintain and possibly improve the safety and reliability of the nuclear arsenal. To validated the research, fast computers are being built to handle the three-dimensional simulations necessary to model a nuclear explosion. The United States could soon be relying on technology that has not been proven with explosive tests to guarantee its national security.

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[83] Mathew L. Wald, "Facing a Potential Shortage, U.S. Considers Making Tritium," *New York Times*, 29 November 1998, p. A22.

Another difference between the United States and the United Kingdom is that the United Kingdom can continue the production of warheads for its Trident missiles for the foreseeable future and successfully guarantee that it has a valid weapons program. However, since the United States does not currently have a production capability, it would have to develop one to meet this challenge in the same way. The warheads produced by this new production capability could not be tested to see if they worked as intended, if the United States ratified the CTBT. The United Kingdom has already tested some of the warheads assembled at its current warhead production plants, and the British government knows that its newly produced weapons can be deployed with a reasonable level of confidence that they will work as intended.

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[84] Transmittal letter from President Clinton to the Senate on the Comprehensive Test Ban Treaty, 23 September 1997.

Political differences are also relevant in the comparison of the United Kingdom and the United States. In the United States, the two party system and the constitutional separation of powers frequently result in a situation in which the President, the chief of the executive branch of the government, is not a member of the same party as the majority in the legislative branch. In the United Kingdom, the parliamentary system is set up so that there is only one party (or, on some occasions, a coalition of like-minded parties) in charge of the legislative and executive actions of the government. That party or governing coalition can usually act with much greater latitude and dispatch than the United States government, owing to the latter's recurrent legislative-executive disagreements.

These constitutional differences have been reflected in the actions leading to CTBT ratification in Britain and in the current debate in the United States. In Britain the Labour Party majority in the House of Commons was able to ratify the CTBT without much interference from the Conservative Party—whose leader, John Major, had signed the treaty for the United Kingdom in September 1996. The slight interference from Conservative Members of Parliament consisted mainly of the questions raised during the discussion in Parliament. (For details, please see chapter III of this thesis.) In the United States the CTBT has often been a topic of partisan disagreement. In 1992, when President Bush signed the act endorsed by Congress that brought about a moratorium on underground testing, it was evidently with some reluctance. He made this decision known to the Senate in a classified report submitted to the Congress on his Administration's last day of office. In an unclassified passage in this report he states,

> ...The Administration has concluded that it is not possible to develop a test program within the constraints of Public Law 102-377 that would be fiscally, militarily and technically responsible. The requirement to maintain and improve the safety of U.S. forces necessitates continued nuclear testing for those purposes, albeit at a modest level, for the foreseeable future. The Administration strongly urges the Congress to modify this legislation urgently, in order to permit the minimum number and kind of underground nuclear tests that the United States requires – regardless of the action of other states – to retain safe and reliable, although dramatically reduced nuclear deterrent forces.[85]

After the United States elected a Democrat as president in 1992, the executive branch and all of its departments, such as the DOD and the DOE, endorsed the new administration's policies, including the CTBT. After the Republicans achieved a majority in Congress in 1994, the level of support in the Congress for ratification of the CTBT declined significantly.

Another key difference between the United Kingdom's ratification process and that in the United States resides in the role of non-governmental organizations (NGOs). In the United Kingdom the historical pattern has been for a small and select group of individuals within a party or coalition of parties holding the majority in the House of Commons to make all the key decisions for the government. In the United States, however, the role of NGOs is much more important than in the United Kingdom.

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[85] President George Bush, as quoted in "First Blood On C.T.B.: Bush, Schlesinger, Barker Make Compelling Case For Continued Nuclear Testing," *Decision Brief*, No. 97-D 160, The Center For Security Policy, 28 October 1997.

Millions of dollars are spent by NGOs to lobby members of Congress and the President in order to influence policy. This is also reflected in the average household, as major NGOs pay for advertisements on television and the radio and in the newspapers to influence the voters to call their representatives and voice their opinions on specific issues. This outside influence results in a more open and heated debate. It also leads to a different process in decision making. In the United States the role of these agencies and organizations is important because they can influence voters. These political dynamics have made for a roller coaster ride for the CTBT, and the end of the ride (ratification or non-ratification) is not yet clear.

B. IMPLICATIONS FOR THE FUTURE OF THE UNITED KINGDOM AND THE UNITED STATES NUCLEAR POSTURES

There are no foreseeable problems in the British nuclear posture unless the Trident missile system develops a fatal flaw. This could cause the United Kingdom to have no nuclear deterrence capability, given that the United Kingdom has decided that the Trident missile will be the only nuclear delivery system in its arsenal. Problems could also arise with the submarines that carry the weapons. However, the feasibility of a surface launches implies that the British could still launch their weapons with the submarine in port. The United Kingdom is therefore hardly affected by the CTBT. Ratifying the CTBT has perhaps increased the diplomatic power of the United Kingdom and allowed it to have more say in world politics, at least with regard to CTBT-associated questions. The United Kingdom has not harmed its national security in any way by ratifying the CTBT, at least in the foreseeable future. This judgment assumes that no stockpile safety or reliability questions will arise that could only be resolved through explosive testing.

The security interests of the United States, on the other hand, could possibly be harmed by the CTBT. If the credibility of the United States nuclear arsenal was called into question, the United States would no longer have an effective nuclear deterrent. If a rogue state believed that the United States no longer had the capability to respond to an act of aggression with a reliable nuclear weapon, the value of the rogue state's weapons of mass destruction (nuclear, chemical, or biological) would increase and the probability of the threat of use against the United States (or United States forces or interests) could also increase.

Every day that the testing moratorium is continued in the United States may be one day closer to a possible failure of a warhead, given the risk of increasing uncertainties about weapons reliability. The chance of this type of failure being a safety failure is probably next to nil. United States weapons have been engineered to be as safe as technology and knowledge allow. If a United States weapon was to fail, it would probably fail by not working. The problem would be confidence in the weapon's reliability, not its safety.

Personnel issues could also raise problems in the United States. The SSMP states that one of its goals is to foster research in nuclear-related topics to ensure that there are always scientists and technicians able to continue the nuclear program. This, however, is to be done without any nuclear explosive tests of the weapon designs. Thus an untested theory could take hold, and maintenance programs based on that theory might not work.

The United States would not be able to prove this until it was too late. Another personnel problem is that soon there will be no one still working for the Laboratories that has ever had one of his or her designs actually tested. Currently at Lawrence Livermore National Laboratory there is only one man that has designed a nuclear warhead and had it tested explosively.[86] He will retire in less than five years. When he leaves, there will be no one at that laboratory that has first hand knowledge on testing one of his or her designs. C. Paul Robinson, the Director of Sandia National Laboratory, has called attention to the technical and scientific challenges under a no-test regime. According to a Congressional report,

> U.S. nuclear weapons will eventually need to be replaced "at some point in the first half of the next century," Robinson said, and "the engineers and scientists who will do that work are probably entering kindergarten this year. No old-timers will be around in 2025 who have had actual experience in designing a warhead." Robinson argues that these future engineers "need to work on real systems. We cannot expect them to acquire critical design skills merely by performing piecemeal component replacement and development simulations."
>
> Robinson also cautioned that the Administration's SSMP could deprive future engineers of the opportunity to work with experienced weapon engineers, contrary to training that will be available for Russian engineers: "Ideally, we would like to train our junior weapon design engineers alongside experienced engineers, but this will not be possible during a decades-long hiatus of no weapon development. The Russian laboratories, by contrast, will be able to pass along their critical weapon design skills to a new generation under their announced plans to rebuild thousands of weapons each year."[87]

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[86] Information from a lecture at Lawrence Livermore National Laboratory, August 1998.

[87] C. Paul Robinson, Director of Sandia National Laboratory, statement given before the United States House of representatives, Committee on National Security, Subcommittee on Military Procurement, 12 March, 1996, as reported by Floyd D. Spence, in *The Clinton Administration and Nuclear Stockpile Stewardship: Erosion by Design*, House National Security Committee, 30 October 1996, p. 12.

Finally, the CTBT might cause proliferation, contrary to the Administration's claim that the CTBT will "contribute to the prevention of nuclear proliferation and the process of nuclear disarmament."[88] According to Kathleen Bailey, "the CTB may actually promote nuclear proliferation. Nuclear testing has demonstrated to our allies, as well as to potential adversaries, that we have a strong commitment to our allies and that our nuclear deterrent is strong. Any decline in the confidence that we have or in our commitment to nuclear deterrence could signal to other nations that are now under our nuclear umbrella that we are not serious. And I would suggest to you that sophisticated nations—Japan, Germany, Italy, who knows which countries—would revisit whether or not they might need their own nuclear option in the future."[89]

James Schlesinger stated, "Individuals who would not allow their lawnmowers, let alone their automobiles, go untested for more than a year will argue with apparent seriousness that our nuclear weapons can remain untested in perpetuity and yet remain reliable."[90] Another comparison that has been suggested concerns an old model of automobile, for instance, a 1970 Ford Mustang. If this automobile was kept in the garage and never started, but cleaned and repaired regularly, could one trust this car in an emergency—for instance, to take someone to the hospital?

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[88] The White House, *The Purpose of the CTBT*, Comprehensive Test Ban Treaty site, found online at http://www.acda,gov/factshee/wmd/nuclear/ctbt/ctbtfs.htm

[89] Kathleen Bailey, "The CTB Treaty and Nuclear Non-Proliferation: The Debate Continues," *Arms Control Today*, March 1998, p. 11.

[90] James Schlesinger, "Clinton Defers a Necessity—Nuclear Testing," *The Wall Street Journal*, 12 July 1993, p. A12.

C. UNITED STATES RESPONSIBILITIES

The CTBT has implications for America's ability to uphold its international security commitments and responsibilities. As was noted in a recent survey of nuclear weapons issues in Europe, including United States nuclear forces and commitments in Europe,

> Some observers conjecture that a CTBT could raise long-term risks for weapons safety and reliability, since it will no longer be possible to test specific weapons, to be sure that aging or the replacement of parts or changes in remanufacturing technologies and procedures or other factors have not impaired their safety or reliability. The absence of safety and reliability testing could, in other words, undermine confidence in U.S. nuclear weapons, potentially including those deployed in Europe.[91]

1. Recommendations for the future of the nuclear stockpile

The lack of testing could in the long term raise significant doubts about the safety and reliability of the United States nuclear arsenal. The United States never planned to maintain the nuclear warheads that it has in its inventory indefinitely. Due to the highly sophisticated designs of the United States weapons, their reliability could be in question without periodic explosive testing. Also, there is no way currently of knowing whether the weapons would work precisely as intended. One possible way that the United States could maintain the reliability of the weapons would be to establish an international testing organization under the IAEA. Harold M. Agnew, the former director of the Los Alamos National Laboratory, proposed this solution to the stockpile reliability question:

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[91] David Yost, *Nuclear Weapons in Europe: Prospects and Priorities,* Future Roles Series Paper #7, sponsored by Defense Programs at Sandia National Laboratories, December 1996, p. 38.

> One procedure which might be pursued would be for an independent entity, such as the IAEA, to select at random a warhead or bomb from one of the systems proposed to be tested by the nuclear powers. Under international surveillance, the primary of a multistage weapon would be removed from the bomb or warhead and tested underground. (The Russians have visited our disassembly facility, PANTEX) One could rotate testing grounds so that each nuclear power could maintain its testing infrastructure if so desired.
>
> Such a procedure could guarantee that no new weapons were being produced and tested and assuming the test results were as anticipated, the credibility of the deterrent would be maintained. Since many of the United States present warheads have been in the stockpile for some tens of years, such a procedure should suffice for another twenty years or so. The idea would be that each nuclear power would have the option of testing a primary from each system once every three to five years. An option could be to test more than one different system in a year for economy reasons if a power so desired. No other nuclear-yield tests would be allowed.[92]

Although Agnew's proposal would allow continued nuclear testing, it would be conducted by an international organization as opposed to a national one. This could be one solution to the reliability question. There is no way other than explosive testing to guarantee that the nuclear stockpile remains reliable.

2. Recommendations for DOD

Harold P. Smith, Jr. and Richard S. Soll have offered the following observations about the relationship between the Department of Defense (DOD) and the Department of Energy (DOE):

> The Department of Defense must be both a faithful partner and a smart customer of the DOE. Of the first, there can be no doubt; the latter

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[92] Harold M. Agnew, "Nuclear Weapon Testing," *Strategic Review*, Winter 96 Vol. XXIV No. 1, pp. 73-74.

remains to be determined. In hearing after hearing before various congressional committees, DOD officials have consistently and effectively supported DOE and its budgets to implement the stockpile stewardship program.

With regard to being a smart customer, it is interesting to note what has changed insofar as the nuclear stockpile and nuclear test explosions are concerned. In the past, acceptance of DOE's certification that the weapon was reliable was based on the very evident, indeed awesome, results of a nuclear explosion. Now, DOD will have to become a smart customer, one possessing the expertise to examine and question DOE reports of simulations, comparisons with archival data and non-nuclear experiments in much the same manner as a prime contractor must judge the performance of highly specialized subcontractors. The country cannot and should not provide duplicated capability in each department, but DOD must be able to accept responsibly or, if necessary, reject authoritatively a DOE certification of a particular nuclear weapon. A failed nuclear test would have been more than sufficient in the past. It will not be available in the future.[93]

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[93] Harold P. Smith, Jr. and Richard S. Soll, *Challenges of Nuclear Stockpile Stewardship Under a Comprehensive Test Ban,* Arms Control Today, March 1998, p. 4.

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